

What is claimed is:

1. An apparatus for generating foam, comprising:
 - (a) a diffuser unit;
 - (b) a housing defining a central axis and having a proximal end, a
5 distal end and an internal chamber within which is positioned the diffuser unit;
 - (c) a first conduit in communication with the proximal end of the housing for supplying a gaseous stream to the diffuser unit;
 - (d) a second conduit in communication with the proximal end of the housing for supplying a water and foam mixture to the diffuser unit; and
10 (e) an outlet located at the distal end of the housing for expelling an aerated water and foam mixture from the housing.
2. The apparatus as defined in claim 1, wherein said diffuser unit includes a dispersing element aligned with the central axis of said housing.
3. The apparatus as defined in claim 2, wherein said dispersing element is a
15 conically shaped element.
4. The apparatus as defined in claim 3, wherein the water and foam mixture supplied to said diffusing unit flows on a flow axis aligned with the central axis of the housing, and wherein the conically shaped element is aligned with the flow axis of the water and foam mixture.
- 20 5. The apparatus as defined in claim 4, wherein the diffusing unit transforms the water and foam mixture supplied to the diffusing unit to a thin film.
6. The apparatus as defined in claim 1, wherein the diffusing unit includes a plurality of nozzle jets, and wherein the water and foam mixture is supplied through said plurality of nozzle jets.
- 25 7. The apparatus as defined in claim 6, wherein the nozzle jets are deployed in an annular configuration within the housing, and wherein the air passes through a conduit defined within the annular configuration.

8. The apparatus as defined in claim 1, wherein the diffusing unit includes a plurality of axially aligned blade structures that bisect the housing.

9. The apparatus as defined in claim 8, wherein the plurality of axially aligned blade structures includes at least two crisscrossing blades that define an internal void.

10. The apparatus as defined in claim 9, wherein the diffusing unit further comprises a dispersing element positioned within said internal void and aligned with the central axis of the housing.

11. The apparatus as defined in claim 1, wherein the first conduit surrounds the second conduit for a predetermined distance.

12. The apparatus as defined in claim 11, wherein the second conduit passes through an outside wall of the first conduit.

13. The apparatus as defined in claim 1, further comprising a pressure gauge associated with at least one of the first conduit and the second conduit.

14. The apparatus as defined in claim 1, further comprising a valving mechanism operatively associated with at least one of the first conduit, the second conduit and the outlet.

15. An apparatus for generating foam, comprising:

(a) a blower or compressor that discharges a gas flow into a first transport line,

(b) a second transport line in communication with a source of a mixture of water and foam;

(c) a nozzle system for generating foam, said nozzle system being in communication with the first and second transport lines and including:

(i) a diffuser unit;

(ii) a housing defining a central axis and having a proximal end, a distal end and an internal chamber within which is positioned the diffuser unit;

- (iii) a first conduit in communication with the first transport line for supplying a gaseous stream to the diffuser unit;
- (iv) a second conduit in communication with the second transport line for supplying the water and foam mixture to the diffuser unit; and
- (v) an outlet located at the distal end of the housing for expelling an aerated water and foam mixture from the housing.

16. The apparatus of claim 15, further comprising a backpack for supporting the blower or compressor.
- 10 17. The apparatus of claim 15, further comprising a wheeled structure for supporting the blower or compressor.
18. The apparatus of claim 17, further comprising a tank for storing the water and foam mixture, the tank being in communication with the second conduit, and wherein the wheeled structure further supports the tank.
- 15 19. The apparatus of claim 18, wherein the wheeled structure is selected from the group consisting of a truck, a firetruck, a cart and a wagon.
20. A method for generating high volume, low pressure foam, comprising:
- (a) providing a source of water and foam mixture;
 - (b) providing a source of air flow:
 - 20 (c) feeding the water and foam mixture and the air flow to a nozzle system, said nozzle system including a diffuser unit for generating foam from said water and foam mixture and said air flow; and
 - (d) discharging the foam generated by said diffuser unit from said nozzle system.
- 25 21. A method according to claim 20, wherein the source of the water and foam mixture is a tank in which water and foam are mixed.
22. A method according to claim 20, wherein the source of the water and foam mixture is a feed line that includes an eductor for mixing the water and the foam.

23. A method according to claim 20, wherein the source of air flow is a blower or compressor.
24. A method according to claim 23, further comprising:
transporting the blower or compressor to a desired location in a backpack.
- 5 25. A method according to claim 20, further comprising:
providing one or more control mechanisms for regulating the feeding of at least one of the water and foam mixture and the air flow to the nozzle system.
26. A method according to claim 20, further comprising:
providing at least one pressure gauge for use in monitoring pressures
10 associated with the feeding of at least one of the water and foam mixture and the air flow to the nozzle system.
27. A method according to claim 20, wherein said foam is a fire fighting foam, and wherein said foam is discharged from said nozzle toward a target that is, at least in part, on fire or under threat of combustion.
- 15 28. A method according to claim 20, wherein said high pressure, low volume foam is used in an application selected from the group consisting of fire fighting, fire prevention, application of foam insulation, delivery of a biological agent, delivery of a chemical agent, delivery of a pest control agent, delivery of an insect control agent, delivery of a crop agent, and washing of a surface.
- 20 29. A method according to claim 20, wherein the water and foam mixture is fed to the nozzle at a rate of about 60 gpm.
30. A method according to claim 20, wherein the water and foam mixture is pumped to the nozzle unit, and wherein the pump generates a pressure of about 400 psi.
- 25 31. A method according to claim 20, wherein the air is fed to the nozzle unit at about 680 cfm at a pressure of about 2 to 5 psi.

32. A method according to claim 20, wherein the ratio between the foam discharged from the nozzle unit and the water and foam mixture fed to the nozzle unit is about 14: 1 to 15:1.

33. An apparatus for generating foam, comprising:

5 (a) a housing defining a central axis and having a proximal end, a distal end and an internal chamber;

(b) a plurality of circumferentially arrayed nozzle jets positioned in the internal chamber of the housing and directed toward the central axis of the housing;

10 (c) a first conduit in communication with the proximal end of the housing for supplying a gaseous stream to the internal chamber;

(d) a second conduit in communication with the proximal end of the housing for supplying a water and foam mixture to the plurality of nozzles; and

(e) an outlet located at the distal end of the housing for expelling an
15 aerated water and foam mixture from the housing.

34. An apparatus according to claim 33, wherein the plurality of nozzle jets are detachably mounted relative to the housing.